Audit Report

OFFICE OF THE INSPECTOR GENERAL

HOTLINE ALLEGATIONS CONCERNING AN UNSOLICITED PROPOSAL ON A FIRE CONTROL RADAR FOR THE LONGBOW SYSTEM

Report No. 94-152 June 29, 1994

Department of Defense

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Acronyms

BAT	Brilliant Anti-armor Submunition
DDRE	Director, Defense Research and Engineering
FAR	Federal Acquisition Regulation
FCR	Fire Control Radar
MMW	millimeter wave
MRI	Mark Resources, Incorporated
THAAD	Theater High Altitude Area Defense
TGW	Terminally Guided Warhead
TSSAM	Tri-Service Standoff Attack Missile

INSPECTOR GENERAL
DEPARTMENT OF DEFENSE
400 ARMY NAVY DRIVE
ARLINGTON, VIRGINIA 22202

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MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION AND TECHNOLOGY
AUDITOR GENERAL, DEPARTMENT OF THE ARMY

SUBJECT: Hotline Allegations Concerning an Unsolicited Proposal on A Fire Control Radar for the Longbow System (Project No. 4AL-8008)

Introduction

We are providing this memorandum report for your information and use. The audit was made in response to Hotline allegations made in a letter to the Inspector General, DoD, relating to an unsolicited proposal on a Fire Control Radar (FCR) for the Longbow System. The complainant made seven allegations, addressing concerns about the evaluation of the unsolicited proposal and the benefits that the DoD was missing by not adopting the proposed technology. The complainant maintained that the proposed technology would solve problems on certain systems and eliminate the need for some systems, thereby saving the DoD billions of dollars.

Audit Results

We identified validity in one allegation (Allegation 1) and no validity in six allegations (Allegations 2 through 7). Although Allegation 1 was valid in that the DoD had not properly evaluated the unsolicited proposal, the valid condition had no adverse consequences. Officials in the Army evaluated the proposal during the audit and concluded that the proposed technology was potentially promising but required additional testing and development before the DoD could determine whether the technology had any practical application. The other six allegations were not valid for various reasons. The proposed technology either was too immature to be applied to systems in development at this time or was not applicable to the systems. Also, the complainant was incorrect in concluding that use of the proposed technology would eliminate the need for specific systems.

Objective

The audit objective was to determine the validity of Hotline allegations that we received concerning an unsolicited proposal on a FCR for the Longbow System.

Scope and Methodology

To satisfy the audit objective, we evaluated the actions taken by the recipient of the proposal, the Director, Defense Research and Engineering (DDRE), to arrange for the Army to evaluate the unsolicited proposal. In evaluating those actions, we used criteria in Federal Acquisition Regulation (FAR), Subpart 15.5, "Unsolicited Proposals." We also reviewed the results of the Army's evaluation of the proposal. Additionally, we visited the program offices that were responsible for the systems identified in the allegations to determine the applicability of the proposed technology to those systems. In doing so, we reviewed records dated from January 1991 through May 1994. We did not use computer-generated data to evaluate the allegations. Enclosure 1 lists the organizations that we visited or contacted during the audit.

We did this program audit from February 1994 through May 1994, in accordance with the auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD.

Internal Controls

We did not assess internal controls because the audit was limited to evaluating the allegations by the Hotline complainant.

Prior Audits and Other Reviews

No audits or reviews in the past 5 years directly related to the allegations.

Background

On July 24, 1993, a defense consultant submitted to the DDRE an unsolicited proposal for a FCR for the Longbow System on behalf of Mark Resources, Incorporated (MRI), a defense contractor in California. The consultant claimed that scientists and engineers from MRI had concluded that continued refinement in conventional radar signal processing technology had reached a point of rapidly diminishing return. Further, MRI had developed a new approach for radar signal processing. The consultant also stated that the radically novel processing technology was capable of identifying stationary targets. The consultant submitted the proposal to the DDRE because MRI had difficulty in getting the technology into ongoing programs.

On September 29, 1993, the Inspector General, DoD, received a letter alleging that the DDRE had not processed the unsolicited proposal in accordance with

the FAR. Further, the complainant alleged that the proposed technology would solve problems on several systems and eliminate the need for some systems, thereby saving the DoD billions of dollars.

Subpart 15.5 of the FAR states that Government agencies shall establish procedures for controlling the receipt, evaluation, and timely disposition of proposals. The Subpart also states that a valid unsolicited proposal must:

o be innovative and unique;

o be independently originated and developed by the offerer;

o be prepared without the Government's supervision;

o include sufficient detail to permit a determination that the Government's support could be worthwhile and the proposed work could benefit the agency's research and development or other mission responsibilities; and

o not be submitted before a requirement that can be acquired by competitive means is established.

Additionally, the Subpart states that when performing a comprehensive evaluation of an unsolicited proposal, evaluators shall consider the following factors:

o unique and innovative methods, approaches, or concepts demonstrated by the proposal;

o overall scientific, technical, or socioeconomic merits of the proposal;

o potential contribution of the effort to the agency's mission;

o the offerer's capabilities, related experience, facilities, techniques, or unique combinations of these that are integral factors for achieving the objectives of the proposal; and

o the qualifications, capabilities, and experience of the proposed principal investigator, team leader, or key personnel who are essential for achieving the objectives of the proposal.

Discussion

The Hotline complainant made seven allegations concerning the unsolicited proposal. Specific details on each allegation are listed below along with the results of our audit of the allegations.

Allegation 1. The DoD violated FAR provisions in evaluating the unsolicited proposal.

Audit Results. The allegation is valid. Officials in the Office of the DDRE did not arrange for engineers in the Army to evaluate the proposal and did not follow-up with officials in the Army to determine whether the proposal was evaluated in a proper and timely manner. The following chronology explains what happened to the proposal after it was received in the Office of the DDRE. The chronology also shows that officials in the Office of the DDRE had not arranged for the proposal to be evaluated by the time we started our audit.

o On July 24, 1993, a defense consultant, acting on behalf of MRI, submitted the unsolicited proposal to the DDRE.

o On July 28, 1993, officials in the Offices of the DDRE logged the unsolicited proposal into a suspense tracking system.

o On August 6, 1993, officials in the Office of the DDRE sent the proposal to the Deputy Assistant Secretary of the Army (Research and Technology) for evaluation.

o On September 22, 1993, an official in the Office of the DDRE informed the defense consultant who represented MRI that the proposal had been lost.

o On September 29, 1993, the complainant asked the Inspector General, DoD, to determine whether federal statutes pertaining to unsolicited proposals had been violated.

o On October 26, 1993, officials in the Office of the DDRE informed the defense consultant who represented MRI that the proposal was hand carried to representatives of the Army's Night Vision and Electronic Sensor Directorate at Fort Belvoir, Virginia, for evaluation. The Directorate was responsible for advanced reconnaissance, surveillance, and target acquisition programs, as well radars for future helicopters, within the Army.

o On January 11, 1994, representatives of the Night Vision and Electronic Sensor Directorate informed us that they did not receive the proposal. However, the representatives did acknowledge receiving a partial statement of work related to similar issues raised by representatives of MRI. Engineers from the Night Vision and Electronic Sensor Directorate were actively analyzing the statement of work and meeting with representatives of MRI.

o On January 11, 1994, we asked the Acting Associate Director of Operations at the Night Vision and Electronic Sensor Directorate to formally evaluate the proposal. The Acting Associate Director agreed to evaluate the proposal.

o On April 15, 1994, engineers at the Night Vision and Electronic Sensor Directorate completed their evaluation of the proposal. The results of their evaluation are discussed in the Audit Results for Allegation 2.

The primary reason that officials in the Office of the DDRE were not responsive to the unsolicited proposal was that the officials did not routinely receive unsolicited proposals. Consequently, the officials had not established procedures or practices to control the receipt, evaluation, and timely disposition of unsolicited proposals. Instead, the official logged the unsolicited proposal into a suspense tracking system and processed the proposal as routine correspondence.

We are not making any recommendations to the DDRE on the matter because the Special Assistant to the Deputy DDRE issued an interoffice memorandum addressing the matter. We are convinced that the memorandum should ensure the timely evaluation of future unsolicited proposals.

Allegation 2. The new signal processing technology that MRI proposed could provide algorithms that would allow the FCR for the Longbow System to acquire stationary targets.

Audit Results. The allegation was unsubstantiated. The proposed technology was potentially promising but was not sufficiently mature to include in the Longbow System. The proposal was in the early technical base stage of development, resembling basic exploratory research and development, while the Longbow System was in the latter stages of the Engineering and Manufacturing Development Phase of the acquisition cycle.

Engineers from the Night Vision and Electronic Sensor Directorate concluded that utilizing the proposed technology warranted further evaluation. However, the engineers added that the proposal was limited in several respects. Specifically, the proposal lacked detailed information. The proposal made broad claims concerning performance; however, little scientific validation supported the claims. Last, the proposal required considerably more creditable evidence as to its utility before considering it for a major Army program.

Additionally, the engineers concluded that the proposed technology might have some future use in the Army's Target Detection and Classification Program provided that the testing of the technology demonstrates its fundamental soundness.

Allegation 3. The proposed technology would solve the clutter background problem experienced by the Longbow Hellfire Missile when targets are in snow at high grazing angles.

Audit Results. The allegation was unsubstantiated. Engineers at the Research Development and Engineering Center, Army Missile Command, informally evaluated the proposal and concluded that the proposed technology was not applicable to the Longbow Hellfire Missile. The Longbow Missile was not required to classify or identify a target. The missile only tracks the radar signature of the target.

The complainant subsequently acknowledged to us that the proposed technology was not applicable to the Longbow Hellfire Missile.

Allegation 4. The technology developed by MRI could save billions of dollars if applied to existing programs. Specifically, it was alleged that the expensive and troublesome infrared seeker in the Arrow Missile would no longer be needed and that the millimeter wave (MMW) seeker proposed by MRI would ensure hitting the desired aimpoint on the target.

Audit Results. The allegation was unsubstantiated. The DoD could not save any funds on the Arrow Program because the DoD did not plan to equip United States forces with the Arrow. The Arrow Program is a joint DoD - Israeli program. However, the DoD did not participate in the development of the FCR and the DoD participation in the missile seeker was limited to providing advice. The government of Israel was developing the FCR and MMW seeker for the missile. The DoD was providing only the technology for the missile and the launcher.

Even if DoD could realize savings by applying the technology to the Arrow Program, engineers at the Night Vision and Electronic Senor Directorate concluded that the proposed technology was too immature to incorporate into the Arrow Program. The Arrow Program had already completed critical design review of the Arrow System. The Arrow was in the Israeli equivalent of the DoD's Engineering and Manufacturing Development Phase of the acquisition process.

Allegation 5. Incorporating the technology developed by MRI into the Patriot MMW seeker will ensure that the missile will hit the desired aimpoint.

Audit Results. The allegation was unsubstantiated. For the same reason as discussed for other systems, the proposed technology was too immature to incorporate into the Patriot System. Equally important, the Patriot System did not possess the process capacity to accommodate the algorithms in the proposed technology. Several algorithms in the proposed technology required taking

many measurements as a beam was swept across the target. Since each individual measurement required a long dwell wave form, the algorithm would use excessive radar time and power resources. Such use was not compatible with the multifunctional requirements of the Patriot System. The Patriot System must schedule and control the allocation of radar resources, such as time and power to research, track, discriminate, and guide functions. Excessive use by any one function was unacceptable in terms of the operation and performance of the Patriot System.

Allegation 6. If the accuracies of the Arrow and Patriot Systems were improved by using the proposed technologies developed by MRI, the Theater High Altitude Area Defense (THAAD) System would not be needed. Therefore, the THAAD System could be cancelled, saving $8.6 billion.

Audit Results. The allegation was unsubstantiated. The planned use of the THAAD System substantially differs from the planned uses of the Patriot and Arrow Systems. The THAAD System was being developed to counter the extended high-altitude, long-range threat of non-air breathing missiles that potentially contain warheads that not only require destruction, but dispersion, to be effectively neutralized. The THAAD System should be able to destroy tactical ballistic missiles at about 10 times the range and altitude of existing anti-missile systems, such as the Patriot System. The capability to destroy targets outside the atmosphere could not be duplicated by either the Patriot or Arrow System. The Patriot System was designed as a typical air defense system to counter air threats in the locality of U.S. forces (relatively low altitude, limited range, and within the atmosphere). The Arrow System was somewhat different in that the Israelis considered it to be a strategic system. However, the System was still limited to targets within the atmosphere.

Allegation 7. The Terminally Guided Warhead (TGW) hardware, already developed, would be completely adequate for the planned use of the Brilliant Anti-armor Submunition (BAT). By selecting the TGW, the DoD could cancel the Tri-Service Standoff Attack Missile (TSSAM) and the BAT Programs, thereby reducing the deficit by $746 million requested in FY 1994 plus the many billions of dollars requested in the classified Program Objective Memorandum.

Audit Results. The allegation was unsubstantiated. The TGW System was not adequate for the BAT mission. The Army decided in 1990 that the TGW System did not have the range and the capability to satisfy the Army's requirements. The Congress asked the Army to select only one smart submunition for continued development. Also, the Congress directed the Army to satisfy its most important military requirement. To satisfy the congressional request, the Army made an evaluation to select a single submunition for its long-range mission. In making the evaluation, the Army reviewed the

capabilities of the BAT System, the Infrared Terminally Guided Submunition, and the TGW System, even though the TGW System was being developed for the shorter range Multiple Launch Rocket System. The evaluation concluded that certain aspects of the requirement for a long-range mission capability could be satisfied only by the BAT System. The Army selected the BAT System over competing systems, such as the TGW System, because of its large acoustic footprint. The BAT System was effective when deployed against moving armor arrays, even when overcoming large target location uncertainties and delivery errors.

As for the complainant's allegation that the TSSAM Program could be cancelled, the Army has already cancelled the TSSAM Program due to budgetary constraints. The Army plans to use the Army Tactical Missile to deliver BAT submunitions.

Management Comments

A draft of this memorandum report was provided to officials within the Office of the Director, Defense Research and Engineering, and the Army. Since this memorandum report contains no recommendation, written comments to our conclusions were not required. Management elected not to respond.

The courtesies extended to the audit staff are appreciated. If you have questions on this audit, please contact Mr. Rayburn H. Stricklin, Program Director, at (703) 614-3965 (DSN 224-3965) or Mr. D. Michael Welborn, Acting Project Manager, at (703) 693-2664 (DSN 223-2664). Enclosure 2 lists the planned distribution of this report.

David K. Steensma

David K. Steensma
Deputy Assistant Inspector General
for Auditing

Enclosures

Organizations Visited or Contacted

Office of the Secretary of Defense

Office of the Director, Defense Research and Engineering, Washington, DC

Department of the Army

Army Missile Command, Huntsville, AL
- Program Executive Office Tactical Missiles, Huntsville, AL
  - Brilliant Anti-Armor Submunition Project Office, Huntsville, AL
  - Longbow Hellfire Project Office, Huntsville, AL

Communications and Electronics Command, Fort Monmouth, NJ
- Night Vision and Electronic Sensor Directorate, Fort Belvoir, VA

Missile Defense Command, Huntsville, AL
- Program Executive Office Missile Defense, Huntsville, AL
  - Army Theater Missile Defense Program Office, Huntsville, AL
  - Arrow Project Office, Huntsville, AL
  - Patriot Project Office, Huntsville, AL
  - Theater High Altitude Area Defense Project Office, Huntsville, AL

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Audit Team Members

Donald E. Reed
Thomas F. Gimble
Rayburn H. Stricklin
D. Michael Welborn
Mary Ann Hourclé